

FIN 570 Quantitative Methods in Finance

Extra Credit Work

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Part III: Family Project

Problem 2.4 Try to apply what you learned from this chapter to help with your family asset. Talk with your grandparents/parents or other family members, pick a financial/real asset owned by your family, write a 3 to 5-page report.

(1) Why did your family have that asset? What is the area you could help?

Mutual funds pool money together from a group of investors and invest that capital into different securities such as stocks, bonds, money market accounts, and others. The financial crisis of 2008 made it clear that investing in any one sector is risky and cannot be relied upon when it comes to savings. Ask any investment professional, and they'll likely tell you that one of the most important ways to reduce your risk is through diversification. That is where mutual funds come into play. For years, we have invested in Mutual funds via systematic-investment-plans and lump-sum amounts now and then. The only issue is that we have always invested in funds that have previously been trending in the news or listening to the opinions of other people. I believe with my knowledge of the working of the financial markets, I will be the right person to guide my family on how to analyze funds effectively and select funds which will be better suited to meet our financial goals.

(2) Understand that asset and make a proposal for help.

A mutual fund is a company that pools money from many investors and invests the money in securities such as stocks, bonds, and short-term debt. The combined holdings of the mutual fund are known as its portfolio. Investors buy shares in mutual funds. Each share represents an investor's part ownership in the fund and the income it generates. My primary goal

would be to analyze existing mutual funds in my portfolio to decide whether to reinvest the money into another fund or to keep my funds in the same funds. Analysis of mutual funds begins by identifying goals and risk tolerance. As an investor, it is important to understand the purpose of the investment. Will the money be used to pay for college expenses, or to fund a retirement that's decades away? Personal Risk Tolerance must also be taken into consideration. Can my family accept dramatic swings in portfolio value? Or is a more conservative investment more suitable? The next step would be select the fund style and fund type. Growth and capital appreciation funds generally do not pay any dividends. If you need current income from your portfolio, then an income fund may be a better choice. Mutual fund companies make money by charging fees to the investor. A front-end load fee is paid out of the initial investment when you buy shares in the fund, while a back-end load fee is charged when you sell your shares in the fund. These fees can decrease your returns on investment depending on the percentage of fees. As with all investments, it's important to research a fund's past results. Following is a list of questions that prospective investors should ask themselves when reviewing a fund's track record:

- Did the fund manager deliver results that were consistent with general market returns?
- Was the fund more volatile than the major indexes?
- Was there unusually high turnover that might impose costs and tax liabilities on investors?

The answers to these questions will give your insight into how the portfolio manager performs under certain conditions, and whether we should invest in the fund or not.

(3) A plan to get data and conduct quant analysis in R.

Dataset : <https://www.kaggle.com/stefanoleone992/mutual-funds-and-etfs>

The file contains 24,821 Mutual Funds and 1,680 ETFs with general aspects (as Total Net Assets, management company and size), portfolio indicators (as cash, stocks,

bonds, and sectors), returns (as year-to-date, 2020-11) and financial ratios (as price/earning, Treynor and Sharpe ratios, alpha, and beta).

Dataset Cleaning

- Dataset cleaning process serves to prepare a dataset for the training and inference phase. The cleaning phase consists of:
- Replacing all different NaN values with single consistent NaN indicator
- Removing columns with low-value information (ones that have many unique values i.e. fund name)
- Separation of categorical and numerical attributes
- Preparing categorical columns:
- Populate NaN values
- Label encode columns
- One-hot encode columns
- Preparing numerical columns:
- Determine quantile and standard deviation of each column
- Populate NaN values using the Normal (Gaussian) distribution

In addition to all this, I will be performing Bivariate analysis to determine correlation between each factors that explain the returns as we did in the class. Afterwards quick multifactor regression will help me to determine which factors are significant to explain mutual fund returns like stock returns and I will be able to suggest my father to keep a eye on that factor when investing the money in any mutual Fund.

(4) From a family member (owner of that asset): a paragraph of comments about your conversation and plan.

After explaining the above plan to all my family members, most of them agreed that we should work according to it to determine the funds which would be ideal for our investment goals. Although some elders in my family argued that the funds, they are currently invested in have given good returns and that changing funds at a time when markets are volatile would be not considered as a prudent investment decision. I presented them returns of similar mutual funds over the same time horizon and explained to them the importance of relative returns which displays whether our fund outperformed its peers or not. Another point of argument was when my elder brother pointed out that as markets have been very volatile in the

last few months, it is better to remove our capital from funds and invest them into a safe haven like Gold. Although gold has been a good alternative option to hedge capital in the past, it has also been at times the victim of high inflation. Not only are funds much more liquid in nature, but they have also historically performed better during periods of high inflation. These arguments proved sufficient to convince my family to modify our portfolio and hopefully earn higher returns in the future.